2.14 DME - PILOT MODEL

Brawler applies a dual approach to the modeling of human decision processes called "value-driven decision-making" and "information-oriented decision architecture." The "information-oriented decision architecture," features an explicit simulation of the flow of information into each pilot's personal situation perception (mental model) and the requirement that simulated pilot decisions be based only on this information. This approach allows the modeling of surprise, confusion, and the limited ability of pilots to communicate and cooperate. Information-oriented decision architecture is a prerequisite to any assessment of the utility of avionics that enhance (or degrade an enemy's) situation perception.

Figure 2.14-1 illustrates the information-oriented architecture of Brawler. The intent of this architecture is to accurately model pilot situation perception and its consequences. The central status arrays contain the true physical state of simulation entities. This includes variables describing aircraft and missile positions, velocities and orientations, as well as less directly observable items such as fuel state. Each simulated decision-making element (DME) has a personal mental status array that mirrors the central status. This imaging, however, is imperfect; a pilot will not know precisely where other aircraft are or exactly how fast they are going. More important, aircraft and missiles of which he is unaware will be entirely absent from his mental model.

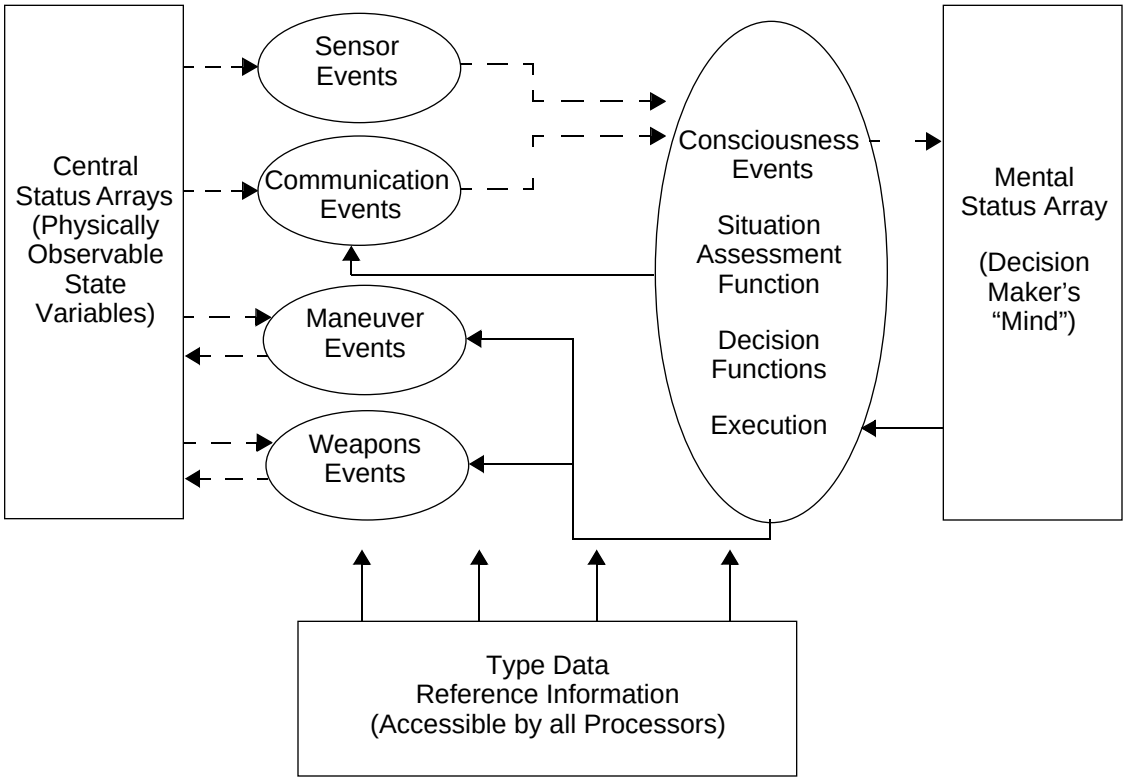

FIGURE 2.14-1. Conceptual Representation of Information Flow.

The consciousness event, which is responsible for pilot decisions, is not directly connected to the central status; all decisions are made on the basis of data in the mental status array. Information arrives in the mental model (Decision Maker's Mind) via sensor events which simulate visual, radar, and other avionics detections of aircraft and missiles, and through communication events which regulate the exchange of information among members of a flight and GCI controllers (not shown in the figure). Incoming information is processed by the pilot's mental model and is then deposited in his mental status array. Decisions cause physical actions to occur either directly, via communications, aircraft maneuver events and weapons employment events, or indirectly by setting objectives for other decisions. It is the results of these actions that alter the central status arrays.

2.14.1 Functional Element Design Requirements

2.14.2 Functional Element Design Approach

Design Element 14-1: Update Knowledge of Ownship

2.14.3 Functional Element Software Design

2.14.4 Assumptions and Limitations

2.14.5 Known Problems or Anomalies